

WHAT IS CLAIMED IS:

1. A protective device for deflecting or reducing short duration, large current electromagnetic impulses traveling along a RF cable while allowing desired RF signals to pass through comprising:

a. an outer conductor, said outer conductor comprising a main body section, a first connector and a second connector, said main body section having a first end and a second end, said first connector extending out from the first of the main body section, said main body section being in the form of a housing having an inner sidewall, said second connector extending out from the second end of the main body section,

b. an inner conductor axially disposed within the outer conductor and extending through said main body section into said first and second connectors,

c. insulators for mechanically supporting and electrically insulating the inner conductor from the outer conductor,

d. a protective element disposed inside the main body section between the inner sidewall in the main body section and the inner conductor, and

e. a spring of electrically conductive material disposed inside the main body section between the inner sidewall and the protective element.

2. The protective device of claim 1 wherein said first connector comprises a female connector.

3. The protective device of claim 2 wherein said second connector comprises a female connector.

4. The protective device of claim 3 wherein said inner conductor comprises an elongated pin.

5. The protective device of claim 4 wherein said elongated pin is uniform in cross-sectional diameter throughout its length.

6. The protective device of claim 5 wherein there are two insulators, one at each end of the pin.

7. The protective device of claim 6 wherein the insulators are spool shaped.

8. The protective device of claim 7 wherein the protective element is a GDT, and wherein the GDT is mechanically coupled to the spring.

9. The protective device of claim 8 and further including an O-ring between the second connector interface and the main body section.

10. The protective device of claim 4 wherein said elongated pin has a pair of outer sections and a center section and wherein said center section has a smaller cross-sectional diameter than the two outer sections.

11. The protective device of claim 10 wherein said insulators comprise two insulators, each extending the length of one of the outer sections.

12. The protective device of claim 10 wherein said insulators comprise two spool shaped insulators and two disc shaped insulators.

13. The protective device of claim 2 wherein said second connector comprises a male connector.

14. The protective device of claim 2 wherein said second connector is a male connector.

15. The protective device of claim 2 wherein said inner conductor is an elongated pin having a center section and a pair of outer sections, the center section

having a smaller cross-sectional diameter than the outer sections and the second connector comprising a male connector.

16. The protective device of claim 10 wherein said protective element is a GDT and wherein said GDT is soldered to said pin and mechanically attached to said spring.

17. The protective device of claim 10 wherein the insulators are tuned to improve RF performance.

18. A protective device for deflecting or reducing short duration, large electromagnetic impulses traveling along a RF cable while allowing desired RF signals to pass through comprising:

a. an outer conductor, said outer conductor comprising a main body section, a first connector and a second connector, said main body section having a first end and a second end, said first connector extending out from the first of the main body section, said main body section being in the form of a housing having an inner sidewall, said second connector extending out from the second end of the main body section,

b. a pair of inner conductors disposed within the outer conductor and extending through said main body section into said first and second connectors,

c. insulators for mechanically supporting and electrically insulating the pair of inner conductors from the outer conductor,

d. a pair of protective elements disposed inside the main body section between the inner sidewall in the main body section and the inner conductor, and

e. a pair of springs of electrically conductive material disposed inside the main body section each between the inner sidewall and one of the protective elements.

19. A protective device for deflecting or reducing short duration, large current electromagnetic impulses traveling along a RF cable while allowing desired signals to pass through comprising:

- a. an outer conductor,
- b. an inner conductor,
- c. at least one insulator for mechanically supporting and electrically insulating the inner conductor from the outer conductor,
- d. a protective element, and
- e. a spring of conductive material,
- f. the protective element being disposed between the inner conductor and the spring, and
- g. the spring being disposed between the protective element and the outer conductor.

20. A protective device for deflecting or reducing short duration, large current electromagnetic impulses traveling along an RF cable while allowing desired signals to pass through comprising:

- a. an outer conductor having a main body section and connecting interfaces at opposite ends of the main body section,
- b. an inner conductor,
- c. at least one insulator for mechanically supporting and electrically insulating the inner conductor from the outer conductor, and
- d. a protective element,

e. the protective element being disposed between the inner conductor and the outer conductor,

f. wherein the RF transmission impedance of the connecting interfaces are lower than the RF cable characteristic impedance and the RF impedance of the main body is greater than the characteristic impedance of the RF cable.